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CITGO Petroleum Corporation
P. O. Box 3758
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Material Safety Data Sheet

Trade Name:	**CITGO Antifreeze and Coolant**	Date: July 14, 1995	
CAS No.:	Mixture	Commodity Code No.:	57-201
Synonyms:	Ethylene Glycol, Glycol	Technical Contact:	(918) 495-5933
		Medical Emergency:	(918) 495-4700
CITGO Index No.:	0161	CHEMTREC:	(800) 424-9300

MATERIAL HAZARD EVALUATION

(Per OSHA Hazard Communication Standard
[29 CFR Part 1910.1200])

Health Precautions: DANGER: HARMFUL OR FATAL IF SWALLOWED. CONTAINS ETHYLENE GLYCOL. Do not drink antifreeze. If ingested, material may cause central nervous system depression, potentially lethal hypertension, abnormally fast heartbeat, rapid breathing and kidney damage. Do not inhale mists or hot vapors.

Safety Precautions: Do not store in open or unlabeled containers. Wash thoroughly after handling. Keep out of reach of children and animals.

1.0 GENERIC COMPOSITION / COMPONENTS

HMIS Rating[1]: Health: 2 Flammability: 1 Reactivity: 0

[1]Hazard Rating: least-0; slight-1; moderate-2; high-3; extreme-4.
CITGO assigned these values based upon an evaluation conducted pursuant to NPCA guidelines. Use of an asterisk (*) indicates that the material may present chronic health effects.

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1.0 GENERIC COMPOSITION / COMPONENTS (continued)

Components	CAS #	%	Hazard Information
Ethylene Glycol	107-21-1	90 - 95	Inhalation TCLo (human): 10,000 mg/M^3 Oral LD50 (cat): 1,650 mg/kg Oral LD50 (dog): 5,500 mg/kg Oral LD50 (guinea pig): 6,610 mg/kg Dermal LD50 (rabbit): 9,530 mg/kg Ethylene glycol causes birth defects in laboratory animals.
Diethylene Glycol	111-46-6	0 - 5	Oral TDLo; (child): 2,400 mg/kg Oral LC50 (rat): 12,565 mg/kg Inhalation LCLo (mouse): 130 mg/ M^3/2H Dermal LD50 (rabbit): 11,890 mg/kg;
Dipotassium Phosphate	7758-11-4	< 5	Oral TD (dog): 0.8 gm/kg (elevated creatinine, blood urea, and renal damage) Oral (human): ND (lower blood pressure, peripheral vascular collapse, cardiac arrhythmia, and heart blockage.)
Additives and Dyes	Mixtures	< 5	Inhalation (human): Irritant Dermal (human): Mild irritant

2.0 PHYSICAL DATA

PHYSICAL HAZARD CLASSIFICATION (Per 29 CFR Part 1910.1200)

Combustible:	No	Flammable:	No	Pyrophoric:	No
Compressed Gas:	No	Organic Peroxide:	No	Reactive:	No
Explosive:	No	Oxidizer:	No	Stable:	Yes

Boiling Point °C (°F):	126 (325)
Specific Gravity (Water = 1):	1.11 - 1.14
Vapor Density (Air = 1):	2.14
% Volatiles by Volume:	ND
Freezing Point °C (°F):	-37 (-34)
Vapor Pressure mmHg:	0.05
Solubility in Water, % by Weight:	Soluble
Evaporation Rate (Butyl Acetate = 1):	<0.002
pH (50% by vol.):	10 - 11
Appearance and Odor:	Odorless, blue-green liquid

3.0 FIRE AND EXPLOSION DATA

Flash Point, °C (°F):	121 (250)
Autoignition Temperature °C (°F)	398 (748) (estimate based upon component information)
Flammable Limits (% by volume in air):	Lower: 3.2 Upper: ND
NFPA Rating[2]:	Health: 2 Flammability: 1 Reactivity: 0
Extinguishing Media:	For small fires use dry chemical or carbon dioxide. For large fires use water spray, fog or foam.
Special Fire Fighting Procedures:	Use self-contained breathing apparatus in confined spaces. Use water spray or fog nozzle to keep containers cool.
Fire Fighting Phases:	Do not enter fire area or confined spaces without supplied air respiratory equipment and proper protective equipment. Ventilate enclosed areas before entering.
Unusual Fire or Explosion Data:	Ethylene glycol presents a moderate explosion hazard when exposed to flame.

4.0 REACTIVITY DATA

Stability:	Stable.
Conditions to Avoid:	Ethylene glycol can react violently with chlorosulfonic acid, oleum, sulfuric acid, perchloric acid, nitric acid and phosphorus pentasulfide.
Incompatibility:	Strong oxidizers. Ethylene glycol ignites on contact with chromium trioxide, potassium permanganate or sodium peroxide.
Hazardous Decomposition Products:	When heated to decomposition temperatures, this material emits carbon monoxide, carbon dioxide and irritating and acrid fumes.
Polymerization:	NA

[2]Hazard Rating: least-0; slight-1; moderate-2; high-3; extreme-4.
CITGO assigned these values based upon an evaluation conducted pursuant to NFPA guidelines.

5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

If this product is released, the following steps should be taken:

- Remove all sources of heat and ignition.
- Isolate the area of the spill and restrict access to response personnel wearing protective equipment.
- **Small Spills:** Absorb released material with non-combustible absorbent. Place into containers for later disposal. (See Waste Disposal section below.)
- **Large Spills:** Evacuate area in the event of significant spills. Adequately ventilate area and determine potential exposure conditions. Exposure potential may require the use of personal protective equipment. Contain spill in temporary dikes to avoid product migration and to assist in recovery. Do not allow material to escape into sewers, ground water, drainage ditches or surface waters.
- Report releases as required by law to the appropriate state and federal authorities.
- **Waste Disposal:**
- Treatment, storage, transportation and disposal must be in accordance with applicable Federal, State, and local regulations.
- Contact the RCRA/Superfund Hotline at (800) 424-9346 or your regional US EPA office for guidance concerning case specific disposal issues.
- **Protective Measures During Repair and Maintenance of Contaminated Equipment:**
- Refer to Section 7.0 - Special Protection Information.
- Drain and purge equipment as necessary to remove material residues.
- Use impervious gloves constructed of butyl rubber, natural rubber, neoprene or nitrile rubber and protective work clothing if direct contact is anticipated.
- Eliminate heat and ignition sources.
- Remove contaminated clothing. Launder before reuse.
- Wash exposed skin thoroughly with soap and water.
- Keep unnecessary persons from hazard area.

6.0 HEALTH HAZARD DATA

Health Hazard Classification (Per 29 CFR Part 1910.1200)

Carcinogen:	No	Corrosive:	No
Animal Carcinogen:	No	Irritant:	Yes
Suspect Carcinogen:	No	Sensitizer:	No
Mutagen:	No	Teratogen:	No
Highly Toxic:	No	Target Organs:	Yes, Respiratory system, central nervous system, liver and kidney
Toxic:	No		

Carcinogen or Potential Carcinogen:

Product/Component	CAS No.	Conc. (%)	NTP	IARC	OSHA	Other
CITGO Antifreeze and Coolant	Mixture	100	No	No	No	No

Major Route(s) of Entry: Ingestion and Inhalation.

Toxicity Summary: If ingested, material may cause central nervous system stimulation followed by depression. In severe cases ethylene glycol will cause hypertension, abnormally fast heartbeat, rapid breathing and kidney damage which may result in coma and death.

Acute Exposure Symptoms:

Inhalation: Ethylene glycol is a severe respiratory irritant. In general, the effects become noticeable with airborne concentrations of approximately 60 ppm. Cough and a burning sensation in the trachea are symptoms of inhalation exposures above 80 ppm. Ethylene glycol is a central nervous system depressant. Symptoms of CNS depression include headache, weakness, nausea, dizziness, loss of judgment and coordination. Coma and death at high concentrations are possible.

Dermal Contact: Ethylene glycol is a skin irritant and may be absorbed through the skin.

Eye Contact: Ocular exposure may result in immediate discomfort with mild temporary conjunctiva inflammation. Permanent significant corneal damage is not anticipated.

6.0 HEALTH HAZARD DATA (continued)

Ingestion: The predominant hazard of this product is associated with ingestion of large quantities at a single time. During the first 12 hours, the victim may experience, central nervous system effects such as headache, weakness, nausea, dizziness, loss of judgment and coordination. In mild cases, the patient appears to be drunk but without the breath odor of alcohol. In more severe cases, the patient will experience convulsions and coma. This is followed by cardiopulmonary symptoms including mild hypertension, abnormally fast heartbeat and breathing rate. Kidney complications, including slow or no production of urine, may be expected at 24 to 72 hours after ingestion.

Injection: Subcutaneous or intramuscular injection may cause irritation, inflammation (erythema) and swelling (edema).

Chronic Exposure Symptoms:

Inhalation: Ethylene glycol has been shown to product birth defects in laboratory animals. With repeated inhalation exposure to ethylene glycol vapor, rats, guinea pigs, rabbits, monkeys and dogs produced severe eye irritation in rabbits and corneal damage in rats after 8 days. However, little information is available concerning the effects of chronic inhalation exposure to ethylene glycol in humans. Nervous system disorders were reported in Russian workers exposed to 49 ppm of ethylene glycol over an extended time period.

Dermal Contact: Ethylene glycol will produce skin irritation with repeated or prolonged exposure. Ethylene glycol may be absorbed through the skin.

Eye Contact: Repeated exposure to ethylene glycol vapor to rats, guinea pigs, rabbits, monkeys and dogs produced severe eye irritation in rabbits and corneal damage in rats.

Ingestion: Chronic ethylene glycol ingestion studies of laboratory animals have resulted in kidney damage, often with deposits of calcium oxalate. For example, kidney damage was produced in monkeys when given ethylene glycol in the drinking water. Calcium oxalate crystals were also found in the brain.

Injection: Chronic injection is not a likely route of exposure to humans.

First Aid and Emergency Procedures for Acute Effect:

Inhalation: Terminate exposure immediately. Remove the victim to fresh air. Administer cardiopulmonary resuscitation and oxygen if necessary. Seek medical advice.

Skin Contact: If liquid contacts the skin, rinse exposed area with water. Remove contaminated clothing. Seek medical attention if skin irritation is serious or persists. Wash contaminated clothing before reuse.

6.0 HEALTH HAZARD DATA (continued)

Eye Contact: If this product contacts the eyes, immediately wash the eyes with large amounts of water for 15 minutes, occasionally lifting the lower and upper lids. Get medical attention immediately.

Ingestion: If swallowed, give two glasses of water and induct vomiting. Seek medical attention immediately.

Medical Conditions Aggravated by Exposure:

Preexisting kidney disease.

Notes to Physician:

Ingestion of ethylene glycol have produced an accumulation of glycolate and glyoxalate which form lactate and results in metabolic acidosis, renal failure, heart failure, and pulmonary edema. Kidney insufficiency has been reported after 2 to 3 days of ingestion. The kidney failure may be caused by accumulation of calcium oxalate crystals. Crystalluria can be an early sign of ethylene glycol poisoning.

7.0 SPECIAL PROTECTION INFORMATION

Ventilation Requirements:

Use in well ventilated area. In confined space, mechanical ventilation may be required to keep levels of certain components below applicable workplace exposure levels as evaluated by designated personnel.

Applicable Workplace Exposure Levels:

Chemical Component	ACGIH TLV TWA ppm (mg/M^3)	ACGIH TLV STEL/ Ceiling (C) ppm (mg/M^3)	ACGIH TLVs Skin notation?	OSHA PEL TWA ppm (mg/M^3)	OSHA PEL STEL/ Ceiling (C) ppm (mg/M^3)	OSHA PEL Skin notation?
Ethylene Glycol	NE	50 (127) (C)	No	NE	NE	No
Diethylene Glycol[3]	NE	NE	No	NE	NE	No
Dipotassium Phosphate	NE	NE	No	NE	NE	No

[3]The American Industrial Hygiene Association has established a Workplace Environmental Exposure Level - Eight Hour Time Weighted Average for Diethylene Glycol of 25 ppm.

7.0 SPECIAL PROTECTION INFORMATION (continued)

Specific Personal Protective Equipment:

Respiratory:	Only NIOSH or MSHA approved combination organic vapor and dust/mist respirator should be used. For airborne concentrations at or above 500 ppm, a supplied-air respirator or self-contained breathing apparatus with a full face mask must be used. Respiratory protection should be selected on the basis of the maximum anticipated concentration.
Eye:	Use splash-proof safety goggles to prevent liquid from coming into contact with the eyes. Contact lenses should not be worn when working with material.
Dermal:	Full body protective work clothing should be worn when handling material. Work gloves constructed of butyl rubber, natural rubber, neoprene or nitrile rubber should be used.
Other Clothing or Equipment:	Wear body-covering work clothes to avoid prolonged or repeated exposure. Garments contaminated with product should be changed. Shower with soap and water to remove any residues from skin. Launder contaminated work clothes before reuse.

8.0 TRANSPORTATION AND SPECIAL PRECAUTIONS

Storage: Do not apply high heat or flame to container.

Caution: Empty containers may contain product residue which could include combustible or explosive vapors. Consult appropriate Federal, State and Local authorities before reusing, reconditioning, reclaiming, recycling or disposing of empty containers and/or waste residual of this product.

DOT Information:

Proper Shipping Name:	Antifreeze, Liquid, n.o.s.
Hazard Class:	Non-hazardous
Hazard Identification Number:	None assigned
Packaging Group	None assigned
Label:	None

9.0 ENVIRONMENTAL DATA

Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA)

Section 313 - Toxic Chemicals

This product contains toxic chemicals above *de minimus* concentrations listed in 40 CFR Part 372 as defined by Section 313 of SARA.

Component	CAS No.	%
Ethylene Glycol	107-21-1	90-95

Section 311/312 - Hazard Categories

This product meets the criteria of one or more of the Hazard Categories as defined by 40 CFR Part 370 as established by Sections 311 and 312 of SARA.

Acute (Immediate Health Hazard):	YES	Sudden Release Pressure Hazard:	NO
Chronic (Delayed Health Hazard):	YES	Reactive Hazard:	NO
Fire Hazard:	NO		

Section 302 - Extremely Hazardous Substances

This product does not contain any chemical components listed as Extremely Hazardous Substances in 40 CFR Part 355 as established by Section 302 of SARA in concentrations greater than one percent.

Clean Water Act (CWA)

Under the CWA, discharges of this product to surface waters without the proper federal and state permits must be immediately reported to the National Response Center at (800) 424-8802.

Comprehensive Environmental Response, Compensation, & Liability Act (CERCLA) - Hazardous Substances

The chemical components listed below are identified as Hazardous Substances in 40 CFR Part 302 as required by Section 102(a) of CERCLA.

Component	CAS No.	%	RQ (lbs.)
Ethylene Glycol[4]	107-21-1	90-95	5,000

[4]Ethylene Glycol is listed as a Hazardous Air Pollutant (HAP) pursuant to the Clean Air Act Amendments of 1991. As a HAP, accidental releases of this product above the reportable quantity must be reported immediately to the National Response Center at (800) 424-8802.

10.0 LABELING

DANGER:

HARMFUL OR FATAL IF SWALLOWED
CONTAINS ETHYLENE GLYCOL

HANDLING

Do not drink anti-freeze or solution.
Keep out of reach of children and animals.
Do not store in open or unlabeled containers.
Wash thoroughly after handling.

FIRST AID:

Ingestion: **If swallowed, give two glasses of water and induce vomiting. Seek medical attention immediately.**

Inhalation: **Remove from exposure vapors. If breathing is interrupted, provide artificial respiration. Seek medical aid.**

Eyes: **Flush immediately with copious amounts of water for at least 15 minutes.**